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Book Review

Restoring Diversity. Strategies for re-introduction of endangered plants.

Edited by Donald A. Falk, Constance I. Millar and Margaret Olwell

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Many ecologists if given the choice would probably prefer to work in 'pristine' systems, where natural processes (unaffected by external, human-induced factors) prevail. Such systems are becoming extremely rare (if there are any left) and ecologists are being called upon to turn their attentions to damaged ecosystems to provide expert advice on how to repair such systems. 'If you know how the system works, surely you can tell us how to fix it when something goes wrong!' is a common call. The discipline of restoration ecology has arrived, and is here is stay. Unfortunately, the 'rules' for applying its tenets in practice are far from clear.

Restoration ecology has many facets. One of the most complex (and often controversial) of these is re-introduction - moving organisms back into sites where they were known to occur or, more generally, into areas within their historical range. Re-introduction is carried out for various reasons. The most obvious and common aim of re-introduction is to establish or augment populations in areas where the original populations have declined (or have been eliminated). Of increasing importance are re-introductions carried out in mitigation - to avoid, reduce or compensate for adverse impacts of development. Although simple in concept, even a cursory browse through the recent literature on re-introductions will reveal a very long list of unknowns and potential pitfalls facing practitioners. There are many technical questions, concerning mainly the feasibility of translocating living organisms (e.g. what sowing method to use, which nutrients to apply, how to stabilize the site). There are also many complex ecological questions, e.g. how many individuals need to be introduced to form the basis for a sustainable population; what proportion of the genetic diversity in a taxon should be incorporated in a relocated population? Many strategic and political questions also demand attention.

Restoring Diversity provides a state-of-the-art overview of the theory and practical problems relating to the re-introduction of endangered plants. The 27 contributors to the volume and almost all the case studies that are reviewed are from North America, and much discussion alludes to practical issues relating specifically to aspects of the Endangered Species Act in the USA. This should not be seen as limiting the value of the discourse to readers from other parts of the world. To the contrary, this tight focus allows the authors to address issues more comprehensively than would have been possible if they had included perspectives from other parts of the world (where different cultural, political and strategic considerations influence options).

The volume is divided into five parts: 1) the environmental and policy context for re-introduction; 2) the biology of rare plant re-introduction; 3) re-introduction in a mitigation context; 4) case studies; and 5) guidelines for developing a rare plant re-introduction plan. Parts one to three each contain theoretical and/or conceptual chapters plus one 'focus' chapter which describes the practical applications or implications of the various issues in a particular case. In part one, the environmental and policy context for re-introduction are considered specifically for endangered plants on Hawaii. *Pinus torreyana* was selected to illustrate biological aspects that need to be considered when considering the re-introduction of a rare plant. Part three ends with a focus on rare plant mitigation in Florida. The seven detailed case studies in part four cover a wide range of plant life forms, taxonomic groups, habitats, and problems and practical issues relating to re-introduction. In the final section, the editors have compiled a very useful set of guidelines for assessing whether re-introduction is appropriate and, if so, how best to carry it out.

Some aspects that are given good coverage in the book, and that will be of particular interest to southern African ecologists, are: aspects of global climate change and how they complicate the management of small populations; designing populations for re-introduction (extremely useful insights for rare plant management); linking ecological theory to practical re-introduction techniques; the opposing arguments on, and new directions in, the issue of translocating plants in mitigation; considering spatial and biological scales. These and other issues dealt with in the book provide very stimulating reading for anyone interested in translating ecological theory into practical guidelines. The editors and publishers deserve special acclaim for a superbly produced book. They have achieved a remarkably smooth integration of styles, and there is a logical flow of ideas and concepts throughout the book. This clearly reflects care in the selection of authors, chapter topics, and very thorough editing. I found very few typos (all those I did find were in reference lists).

I wholeheartedly recommend this book to all conservation biologists and restoration ecologists.

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